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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/902,809	07/30/1997	KLAUS FLORIAN SCHUEGRAF	303.278US1	1584

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EXAMINER

NADAV, ORI

ART UNIT PAPER NUMBER

2811

DATE MAILED: 10/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/902,809

Applicant(s)

SCHUEGRAF ET AL.

Examiner

ori nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23-31 and 36-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-31 and 36-65 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 35. 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23-25, 29, 30, 38, 44-50, 54, 59-62 and 64 are rejected under 35

U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no support for a spacer being formed on the sidewalls of an electrode and not on the first oxide layer, as recited in claim 44, because the specification describes the spacer being formed on the first oxide layer as the first oxide layer being formed below the spacer. Note that the claims (e.g. claims 25 and 29) recite a layer of reoxidation (that is, a second spacer) being formed on the spacer and on the first oxide layer. That is, the spacer is formed on the first oxide layer.

There is no support for a spacer terminating at the boundary between the feature and the oxide layer, and not being in contact with the oxide layer, as recited in claims 23, 47 and 49, because the spacer does not terminate (i.e. reach and be in contact with) at the boundary between the feature and the oxide layer, but is rather spaced apart from

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the boundary between the feature and the oxide layer, as clearly depicted in figure 2D of the present invention.

There is no support for a layer of reoxidation forming a smile at the boundary between the feature and the oxide layer, as recited in claims 25, 29, 30, 38, 46, 48, 50, 54, 59, 61 and 64, because the layer of reoxidation does not terminate (i.e. reach and be in contact with) at the boundary between the feature and the oxide layer, but is rather spaced apart from the boundary between the feature and the oxide layer, as clearly depicted in figure 2C of the present invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23-25, 29, 30, 38, 44-50, 54, 59-62 and 64 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed limitation of a spacer terminating at the boundary between the feature and the oxide layer, and not being in contact with the oxide layer, as recited in claims 23, 47 and 49, is unclear as to how a spacer can terminate (i.e. reach and be in contact with) at the boundary between the feature and the oxide layer, and not be in contact with the oxide layer.

The claimed limitation of a spacer formed on the sidewalls of an electrode and not on the first oxide layer, as recited in claim 44, is unclear as to how a spacer cannot

obj. to specs. Rules: 75 D1 ch. 700 strong in claim
lack of ant. in specs but not

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be formed on the first oxide layer, because the first oxide layer is formed below the spacer. Note that the claims (e.g. claims 25 and 29) recite a layer of reoxidation (that is, a second spacer) being formed on the spacer and on the first oxide layer. That is, the spacer is formed on the first oxide layer.

The claimed limitation of a layer of reoxidation forming a smile at the boundary between the feature and the oxide layer, as recited in claims 25, 29, 30, 38, 46, 48, 50, 54, 59, 61 and 64, is unclear as to how a layer of reoxidation can form a smile at the boundary between the feature and the oxide layer, when the layer of reoxidation is spaced apart from the boundary between the feature and the oxide layer, as clearly depicted in figure 2C of the present invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

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Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 26-28, 31, 36-37, 39-45, 51-53, 63, 65 and 23-24, 47, 49, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. (5,545,578).

Park et al. teach in figure 4H and related text a semiconductor electronic device comprising a first oxide layer 12, 24, at least one feature 14a, 16a, 18a having a surface over the first oxide layer, a boundary between the feature and the first oxide layer, a spacer 22a comprising silicon nitride deposited only on the surface of the feature (column 4, line 54-60).

Regarding claims 27, 31, 36, 52, Park et al. teach in figure 4H and related text the spacer 22a extending and terminating at the boundary.

Regarding claims 24, 28, 31, 37, 42, 53, 63 and 65, Park et al. teach in figure 4H and related text a first oxide layer 12, 24, comprises a layer of gate oxide, the feature 14a, 16a, 18a comprises a gate electrode including polysilicon 14a, a refractory metal 16a, and a dielectric 18a, and a surface of the feature comprises sidewalls of the electrode.

Regarding claims 39, 41, Park et al. teach in figure 4H and related text a second oxide layer 28 deposited on the spacer.

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Regarding claims 40, 41, 43, Park et al. teach in figure 4H and related text a conductive material comprising tungsten silicide.

Regarding claims 23, 47 and 49, Park et al. teach in figure 4 and related text a spacer 22a not being in contact with oxide layer 12.

Claims 26-28, 31, 36-37, 39, 42, 44-45, 51-53, 63, 65 and 23-24, 47, 49, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (5,796,151).

Hsu et al. teach in figure 4 and related text a semiconductor electronic device comprising a first oxide layer 42, at least one feature 13, 14, 15, 16, 17, having a surface over the first oxide layer, a boundary between the feature and the first oxide layer, a spacer 31 comprising silicon nitride deposited only on the surface of the feature (column 2, line 54-57).

Regarding claims 27, 31, 36, 52, Hsu et al. teach in figure 4H and related text the spacer 31 extending and terminating at the boundary.

Regarding claims 24, 28, 31, 37, 42, 53, 63 and 65, Hsu et al. teach in figure 4 and related text a first oxide layer 12, 42, comprises a layer of gate oxide, the feature 13, 14, 15, 16, 17 comprises a gate electrode including polysilicon 13, a refractory metal 14, and a dielectric 16, and a surface of the feature comprises sidewalls of the electrode.

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Regarding claims 39, 41, Hsu et al. teach in figure 4 and related text a second oxide layer 16 deposited on the spacer.

Regarding claims 23, 47 and 49, Hsu et al. teach in figure 4 and related text a spacer 31 not being in contact with oxide layer 12 (see figure 3).

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior section.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25, 29, 30, 38, 46, 48, 50, 54, 59-62 and 64, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Park et al. (5,545,578).

Park et al. teach in figure 7F and related text substantially the entire claimed structure, as recited above, including a semiconductor electronic device comprising a first oxide layer 112, 124, at least one feature 114a, 116a, 118a having a surface over the first

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oxide layer, a boundary between the feature and the first oxide layer, a spacer 122a comprising silicon nitride deposited only on the surface of the feature, and a layer of reoxidation 128 on the spacer and the oxide layer forming a smile at the boundary between the feature and the oxide layer.

Park et al. do not teach a layer of reoxidation being formed by a polycide reoxidation.

The claimed limitation of a layer of reoxidation being formed by a polycide reoxidation is a processing limitation which would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 55-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. or Hsu et al. in view of Liao et al. (5,480,830).

Park et al. and Hsu et al. teach substantially the entire claimed structure, as recited in claim 26 above, except an electrode comprising an undoped silicon.

Liao et al. teach a gate electrode comprising an undoped silicon (column 2, lines 16-19).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a gate electrode comprising an undoped silicon in Park et al. or Hsu et al.'s device in order to use the device in an application which requires high operating voltages.

Claims 40, 41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. in view of Park et al.

Hsu et al. teach substantially the entire claimed structure, as recited in claims 39 and 42 above, except a conductive material comprising tungsten silicide.

Park et al. teach a gate electrode comprising an tungsten silicide 16a. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a gate electrode comprising tungsten silicide in Hsu et al.'s device in order to use a well known material as the conductive material. Note that substitution of materials is not patentable even when the substitution is new and useful. *Safetran Systems Corp. v. Federal Sign & Signal Corp.* (DC NIII, 1981) 215 USPQ 979.

Response to Arguments

Applicant's arguments with respect to claims 23-31 and 36-65 have been considered but are moot in view of the new ground(s) of rejection.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772**.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

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A handwritten signature in black ink, appearing to read 'Ori Nadav', written in a cursive style.

O.N.
9/22/03

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800